

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: Pleurobema hanleyianum

COMMON NAME: Georgia pigtoe

LEAD REGION: 4

INFORMATION CURRENT AS OF: October, 2005

STATUS/ACTION:

☐ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☐ 12-month warranted but precluded - FR date:

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

☐ Listing priority change

Former LP: ☐

New LP: ____

Date when the species first became a Candidate (as currently defined): October 25, 1999

____ Candidate removal: Former LP: ____

____ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

____ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

____ F – Range is no longer a U.S. territory.

____ I – Insufficient information exists on biological vulnerability and threats to support listing.

____ M – Taxon mistakenly included in past notice of review.

____ N – Taxon does not meet the Act's definition of "species."

____ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Clams and Mussels - Unionidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: AL, TN, & GA.

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Murray/Whitfield Counties, Georgia

LAND OWNERSHIP

Stream and river bottoms where the species occur are under State jurisdiction. Riparian lands are privately owned.

LEAD REGION CONTACT: Rick Gooch, 404/679-7124, richard_gooch@fws.gov

LEAD FIELD OFFICE CONTACT: Jackson, Mississippi Field Office, Paul Hartfield, 601/321-1125, paul_hartfield@fws.gov

BIOLOGICAL INFORMATION:

Taxonomy

The Georgia pigtoe was described in 1852 by I. Lea as Unio hanleyianum, from the Coosawatee River in Georgia. It was placed in the genus Pleurobema by Simpson in 1900. The uniqueness of the Georgia pigtoe has been verified both morphologically (Williams et al., in prep.) and genetically (Campbell, in litt., 2004).

Species Description

The shell of the Georgia pigtoe reaches about 65 millimeters (2.5 inches) in length. It is

elliptical in shape, and somewhat inflated. The posterior ridge is poorly developed, low and evenly rounded when evident. Anterior end is rounded, while the posterior margin is bluntly pointed below. Dorsal and ventral margins are curved. Beaks rise slightly above the hinge line, and periostracum (membrane on the surface of the shell) is yellowish tan to reddish brown. The beak cavity is shallow, and the shell interior is dull bluish white (Parmalee and Bogan, 1998).

Habitat

The Georgia pigtoe is found in shallow runs and riffles with strong to moderate current and coarse sand/gravel/cobble bottoms. Fish host and glochidia (parasitic larvae) are unknown.

Historical Range/Distribution

This species was found in large creeks and rivers of the Coosa River drainage of Alabama, Georgia, and Tennessee. The Georgia pigtoe was historically reported from the Conasauga River in Tennessee and Georgia; the Coosawatee, Oostanaula, Coosa, and Etowah Rivers in Georgia; and the Coosa River and tributaries Big Wills, Shoal, Terrapin, Big Canoe, Little Canoe, Yellowleaf, Waxahatchee, Talledega, and Hatchet creeks, in Alabama.

Current Range/Distribution

The species is currently known from localized portions of the upper Conasauga River in Murray and Whitfield counties, Georgia (Johnson and Evans 2000).

Population Estimates/Status

The Georgia pigtoe is very rare. No population estimates are available. In 1990, the Service initiated a status survey and review of the molluscan fauna of the Mobile River Basin. This included extensive surveys and collections from throughout the Coosa River drainage (M. Pierson, Field Records 1991 to 1994, Calera, Alabama, in litt.; Fish and Wildlife Service (Service) Field Records, Jackson, Mississippi, 1991 to 1994). At all localities in the Coosa River drainage, the freshwater mussel fauna had declined from historical levels, and at all but a few localized areas, the fauna proved to be completely eliminated or severely reduced due to a variety of impacts, including point and non-point source pollution, and channel modifications such as impoundment. Following a review of these efforts and observations, the Service reported 14 species of mussels in the genus Pleurobema, including the Georgia pigtoe, as presumed extinct in the Mobile River Basin, based on their absence from collection records, technical reports, or museum collections for a period of 20 years or more (U.S. Fish and Wildlife Service 1994).

The Service and others continued to conduct surveys in the Coosa River drainage for mollusks (M. Pierson, Field Records, 1995 to 1998; M. Hughes, Field Records, Knoxville, Tennessee, 1997 to 1998; D. Shelton, Field Records 1997 to 1998, Mobile Alabama; Service Field Records 1995 to 1998; Williams and Hughes 1998, Johnson and Evans 2000, Gangloff 2003). Several fresh dead and live individuals of the Georgia pigtoe were collected during these mussel surveys in the upper Conasauga River, Murray and Whitfield counties, Georgia (D. Shelton, Alabama Malacological Research Center, pers. comm. 1998; M. Hughes, pers. comm. 1998; Johnson and Evans 2000).

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The Georgia pigtoe has been extirpated from well over 90 percent of its range due to impoundment of historic habitats in Alabama and Georgia. The species is currently known from a short reach of the Conasauga River above Dalton, Georgia.

Small localized populations are vulnerable to land surface runoff that affects water quality or the suitability of aquatic habitats within a watershed. Blocked from avenues of emigration to less affected watersheds, they gradually perish if changes in land use activities cause aquatic habitat conditions to deteriorate. Similarly, if positive land use changes improve previously degraded aquatic habitat conditions, barriers to immigration will, nevertheless, prevent natural recolonization of those areas.

While the detrimental effect of any one source or land use activity may be insignificant by itself, the combined effects of land use runoff within a watershed may result in gradual and cumulative adverse impacts to isolated populations and their habitats. For example, excessive sediments deposited on stream bottoms can smother and kill relatively immobile mussel species, or make their habitat unsuitable for feeding or reproduction (Waters 1995, Hartfield and Hartfield 1996). Suspended sediments can interfere with feeding or affect behavior and reproduction (Waters 1995, Haag *et al.* 1995). Sediment is probably the most abundant pollutant currently affecting this species. Potential sediment sources within a particular watershed include virtually any activity that disturbs the land surface. Highway construction, improper logging practices, agriculture, housing developments, pipeline crossings, or cattle grazing often result in physical disturbance of stream substrates or the riparian zone, and/or changes in water quality, temperature, or flow.

Excessive nutrient input from multiple sources (e.g, nitrogen and phosphorus from fertilizer, sewage waste, animal manure, etc.) into an aquatic system can also have cumulative effects. Land surface runoff contributes the majority of human-induced nutrients to water bodies throughout the country. Large amounts of nutrients in surface runoff can result in periodic low dissolved oxygen levels that are detrimental to aquatic species (Hynes 1970). They also promote excessive algal growth that can eliminate habitat for mussel conglomerates or juvenile mussels requiring clean rock or gravel substrate (e.g., Hartfield and Hartfield 1996). Excessive nutrients within a stream or river can also indicate the potential presence of pathogenic microorganisms. The human population is expanding within the Conasauga River watershed increasing the sediment and nutrient input to the system, and making the Georgia pigtoe vulnerable to progressive degradation from land surface runoff.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

The Georgia pigtoe is not commercially valuable nor is it subject to commercial mussel harvesting activities. The species has been taken for scientific and private collections in the past. Such activity may increase as the species continued existence becomes known. Although

collecting is not considered a factor in the decline of this species, the localized distribution and small size of the known extant populations renders them vulnerable to overzealous recreational or scientific collecting.

C. Disease or predation.

Diseases of freshwater mussels are poorly known. Juvenile and adult mussels are prey items for some invertebrate predators and parasites, and provide prey for a few vertebrate species. Although predation by naturally occurring predators is a normal aspect of the population dynamics of a healthy mussel population, predation may contribute to the further decline of this species due to the localized extent and low numbers of mussels associated with the extant populations.

D. The inadequacy of existing regulatory mechanisms.

Although the negative effects of point source discharges on aquatic communities have been reduced over time by compliance with State and Federal regulations pertaining to water quality, there has been less success in dealing with non-point source pollution impacts. Such impacts result from individual private landowner activities (e.g., construction, grazing, agriculture, silviculture, etc.), and public construction works (e.g., bridge and highway construction and maintenance, etc.).

The Georgia pigtoe is not currently given any special consideration under other environmental laws when project impacts are reviewed, as it lacks State or Federal recognition.

E. Other natural or manmade factors affecting its continued existence.

The threats to the Georgia pigtoe are compounded by its restricted range and low numbers. The surviving populations are vulnerable to random catastrophic events (e.g., flood scour, drought, toxic spills, etc.). Limited range and low numbers also make the species vulnerable to land use changes that would result in increases in non-point source pollution impacts.

The Georgia pigtoe may also be adversely affected by the loss or reduction in numbers of the fish host(s) essential to its' parasitic glochidial stages. The specific fish host(s) for the glochidia of this species is not known; therefore, impacts on this aspect of the mussels' life cycle cannot be evaluated.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

The Service is working to establish a National Wildlife Refuge in the upper Conasauga River. Watershed management outreach has been conducted. The Nature Conservancy has conducted a watershed impact analysis for the Conasauga River watershed. Surveys have been conducted and are ongoing. Genetic studies have been conducted to clarify and confirm taxonomy of this species. The State of Alabama is establishing a propagation facility for imperiled mussels and snails, and has worked with the Service to prepare and implement a Plan for Controlled Propagation, Augmentation, and Reintroduction for freshwater mollusks of the Mobile Basin (U.S. Fish and Wildlife Service 2003).

SUMMARY OF THREATS

Due to its restricted distribution and low numbers, the Georgia pigtoe is threatened by any activity that would affect water or habitat quantity or quality. Threats include nonpoint source runoff from human activities and random natural events such as droughts or floods.

RECOMMENDED CONSERVATION MEASURES

Live Georgia pigtoe mussels need to be located and brought into captivity for life history, host fish, and propagation studies. Populations should be re-established in appropriate stream reaches of historical occurrence.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2*
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The Georgia pigtoe is known from a single extremely limited and small population that is affected by human activities, and vulnerable to natural events such as droughts or floods.

Imminence: Nonpoint source runoff currently affects the known population, and is a factor in streams where the species historically occurred.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. Listed mussel species facing similar threats currently survive in both the Conasauga River where the Georgia pigtoe is known to survive; therefore, Federal actions which may affect the species are subject to the consultation requirements of the Act. Conservation efforts conducted for listed mussels within those areas will benefit the Georgia pigtoe. Survey and research efforts are currently underway to increase knowledge of the life history of this species.

DESCRIPTION OF MONITORING

Since the last update of this assessment form, species experts and appropriate individuals with State and Federal agencies have been contacted and asked to provide any new data on the interrupted rocksnail. These include Dr. Paul Johnson, formerly affiliated with TNARI, now ADCNR; Stan Cook and Jeff Garner, ADCNR; Dan Forster, Georgia Department of Natural Resources (GDNR); Sandy Tucker, Robin Goodloe, and Jeff Powell, USFWS; Jim Williams, U.S. Geological Survey. Dr. Johnson has conducted annual monitoring of mollusks in the Conasauga River and adjacent rivers and streams since 1999.

COORDINATION WITH STATES

Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Alabama and Georgia provided editorial comments.

Indicate which State(s) did not provide any information or comments: N/A

LITERATURE CITED

Peer-reviewed original research based on data:

Haag, W.R., R.S. Butler, and P.D. Hartfield. 1995. An extraordinary reproductive strategy in freshwater bivalves: prey mimicry to facilitate larval dispersal. *Freshwater Biology* 34:471-476.

Hartfield P. and E. Hartfield. 1996. Observations on the conglutinates of Ptychobranchus greeni (Conrad, 1834) (Mollusca: Bivalvia: Unionoidea). *American Midland Naturalist* 135:370-375.

Waters, T.F. 1995. Sediment in streams: sources, biological effects, and control. *American Fisheries Society Monograph* 7. 251 pp.

Peer reviewed secondary research derived:

Hynes, H.B.N. 1970. *The Ecology of Running Waters*. University of Toronto Press, Toronto.

Parmalee, P.W. and A.E. Bogan. 1998. *The freshwater mussels of Tennessee*. The University of Knoxville Press. Knoxville, Tennessee. P. 177-178.

Grey research based on data:

Johnson, P. D. and R.R. Evans. 2000. A contemporary and historical database of freshwater mollusks in the Conasauga River Basin. Report to USGS. SARI, Cohutta, GA.

Williams, J.D. and M.H. Hughes. 1998. Freshwater mussels of selected reaches of the main channel rivers in the Coosa drainage of Georgia. U.S. Geological Survey report to U.S. Army Corps of Engineers, Mobile District. 21 pp. and appendices.

Grey literature based on literature analysis:

Gangloff, M.M. 2003. The status, physical habitat associations, and parasites of freshwater mussels in the upper Alabama River drainage. Doctoral Dissertation, Auburn University. 217 pp.

U.S. Fish and Wildlife Service. 1994. Status review of select mussel species in the Mobile River Basin. Status Report, U.S. Fish and Wildlife Service, Jackson, Mississippi. 3 pp.

U.S. Fish and Wildlife Service. 2003. Freshwater mussels and snails of the Mobile River Basin: plan for controlled propagation, augmentation, and reintroduction. Ecological Services. Jackson, MS. 17 pp.

Williams, J.D., A.E. Bogan, and J. Garner. In preparation. The mussels (Unionidae) of Alabama. The University of Alabama Press. Tuscaloosa, AL.

Other

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Jeffrey M. Fleming 11/16/2005
Acting Regional Director, Fish and Wildlife Service Date



Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do Not Concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005

Conducted by: Jackson, Mississippi Field Office